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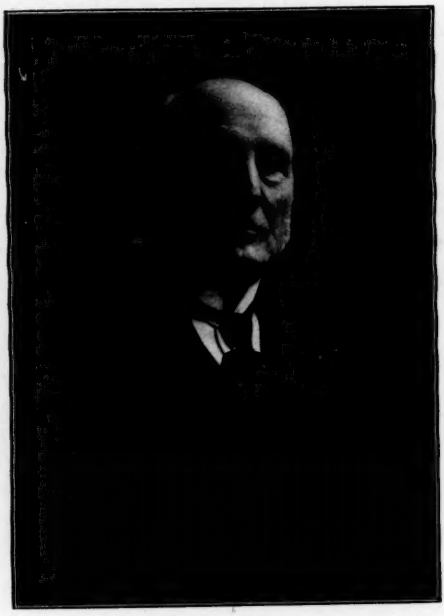

THOMAS REID, M.D.

(1830-1911)

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BRITISH MASTERS OF OPHTHALMOLOGY SERIES

10.—THOMAS REID, M.D.
(1830-1911.)

BY
LESLIE BUCHANAN, M.D.,
GLASGOW.

THOMAS REID was born in what is surely the highest and sternest part of lowland Scotland, and one cannot help thinking that the place left its mark on the child and the man. His life was a strenuous one from beginning to end, and his constant endeavour was to get at the truth of things.

His father was a farmer in the neighbourhood of Shotts, in upper Lanarkshire, and continually impressed on his children the necessity of work, both mental and physical, as a training for the struggle for a place in life.

Early in life, far too early as we would say now, the boy was sent out into the fields in the morning to assist the men who were building, digging, reaping, and threshing; and then, having worked for an hour or two, he went to a school where the "three Rs" were taught.

Having done his daily task in school, he came home to assist again in the fields, and finished the day in preparation of lessons for the morrow.

Later in life, when the village school could not teach him all

his studious mind desired, he was sent to teachers of mathematics, Latin, etc., to enlarge his scope and encourage further learning.

The literature of the home was of the sterner type, such as old Scottish people loved, and was read aloud at the fireside, each member taking a night to read a portion of a work like Gibbon's "Decline and Fall," or Rollin's "Ancient History." Scott's, Thackeray's, and Dickens's works and the Penny Cyclopaedia of the early decades of the nineteenth century were read as light literature.

Thus, from his early years, the serious side of life was looked upon; and as Reid was born in the year of the "Short Corn," 1830, it may be said that he came into a world of stress and endeavour.

When about 12 or 13 years of age, Reid was "put to" a trade, but it was little to his mind, and he attended courses in botany, chemistry, physics, and other branches of science in his hours of leisure. He was led by these studies towards medicine, and ultimately attained his desire when he graduated M.D. in 1857 at the University of Glasgow.

A student from beginning to end of his life, he soon got in touch with the scientific side of medicine and surgery by his interest in pathology, and, whilst practising his profession kept constantly in view the fact that there was infinitely more to learn than had yet been taught. He spent his leisure hours in investigation of unusual histological tissues, and thus laid the foundation of the wide knowledge of pathology and histology which he undoubtedly possessed.

He first went to the Glasgow Eye Infirmary in 1861 as clinical clerk, and saw the practice of Mackenzie and George Rainy, and ultimately was appointed assistant surgeon, and, later, surgeon in association with George Rainy. When Mackenzie died in 1868, the Waltonian Lectureship in the University of Glasgow was filled by the appointment of Rainy. The latter had only occupied it one year, when his early death again left the post vacant, and Reid was appointed. Gradually the general practice which Reid had accumulated was put aside, and he gave his whole attention to ophthalmic medicine and surgery.

Reid's reading was of the widest and most catholic description, and everything in the scope of ophthalmology was his field. He had a quite phenomenal memory, and took no notes of cases or people, yet rarely forgot a patient's case or a word which he had read. He had an extensive and well-chosen library, which he made thorough use of, since he never would allow anything to remain at all ill-defined in his mind. He would hunt everywhere until he found the precise significance to be attached to a word, new or familiar to him, in any given connection. Languages and sciences were Reid's favourite studies, and his knowledge of the former was being extended in his last years when he was working

enthusiastically at Italian. All branches of science were of interest, but botany and geology were probably his favourites. He could converse with astronomers, Egyptologists, or zoologists, and had views upon all questions of importance in most of the sciences.

Much of Reid's knowledge was, of course, derived from reading; but he was an observer also, and studied nature by means of the best telescopes, spectroscopes, and microscopes, etc., which he could procure.

As he had a high opinion of the value of mathematics, especially in relation to physiological optics, Reid worked out, and took great interest in the questions in ophthalmology involving the use of the science.

Unfortunately, he had but limited experience of travel in earlier life, and even his few holidays were for many years spent in one watering place on the Firth of Clyde, until he reached quite an advanced age. In his later years, however, Reid visited many continental cities, and toured in Norway, Switzerland, and Italy.

As an ophthalmic surgeon Reid was constantly a student. He was never quite satisfied about a subject and pursued his researches, especially in histology, until he died.

He was, perhaps, too much the reverse of Mackenzie, for although he had a wide and thorough knowledge of the clinical side of ophthalmology, he was more deeply interested in the pathological anatomy of eye disease than in its symptomatology.

As an operator Reid was extremely dexterous, and his manipulation, especially in cataract cases, was beautiful to watch. He was one of those who hold the view strongly that the less one touches an eye the better, and consequently was extremely careful in selecting cases for operation.

Reid was never a man to seek publicity, and the various devices which he invented or designed for the exact investigation of ophthalmic conditions were not familiar to most ophthalmologists. Probably the most ingenious of these was his colour perimeter in which he used the true colours of the diffraction grating as a source of light. This instrument, described and shown with others at the Ophthalmological Society in 1886, is extremely clever and exact, and its only fault is that it is somewhat too difficult to work with in practice. Thanks to the gentle pressure of various friends, Reid's portable astigmometer is more often used, being one of the most exact of keratometers. He would have been much more widely known had he been less retiring and diffident, but he would not publish anything unless he was satisfied that he had got to the bottom of the well where truth hides.

As a teacher Reid was certainly deficient, in that he could not come down to the level of his students. He assumed a knowledge in his hearers which they, too often, did not possess. For advanced

pupils, however, it was a great pleasure to sit by the fireside and hear his views on various subjects, for he could talk over a case of interest and throw light on many obscure points there, as he could not in a class-room or lecture hall. It is not surprising that he could not condescend to the level of junior students, for he himself had, besides originality, a prodigious grasp of the mass of human knowledge such as is possessed by few.

He was always an enthusiastic histologist and photo-micrographer and it may be said that he died working, for, in his eighty-second year, he rose from bed twelve hours before his death to look at some photographs which he was printing.

It must be very rarely indeed that a man possesses such truly encyclopaedic knowledge as did Reid. No subject from ancient history to modern electricity escaped his notice or was too great or small for his interest. If he had a fault, it was that he was too widely read, and that, in consequence, no one subject was studied in such detail that it could be said to be his speciality.

Being a very sensitive man Reid took no active part in public affairs, rather taking care that no one knew what he was doing or thinking. He was really most generous and kind-hearted as many of his patients can testify, but he did not like to appear so.

One of the most pleasant traits in Reid's character was his simple friendliness. The writer will always retain happy memories of those evenings by his fireside when he would show his latest histological material or take a photograph of some microscopic object which had specially interested him. No less happy are the memories of country walks, in the course of which the theme of conversation would be the botanical features or the geological characteristics of the countryside; or again, possibly, its historical interest. Under starry skies of an autumn evening the conversation turned to astronomy, of which science Reid had more than passable knowledge, and on which his conversation was interesting and instructive.

He delighted too to talk of books and of people he had met. He revered the giants of his early days, men like Sir William Bowman, and, generally speaking, his estimate of a man corresponded with the evidence shown of being a searcher after truth.

Yet, Reid's conversation was not always of a serious type. He had a fund of humour which was sometimes surprising to those who did not know him well. He would, and often did, tell an amusing story, albeit the manner of telling it might be somewhat quiet and dry.

If, through his retiring disposition, Reid failed in some degree to reach his proper place in the world of science, it may be said most truly that, by a very wide circle of friends and patients in the West of Scotland, his name and fame will never be forgotten.

COMMUNICATIONS

ON TONOMETRIC VALUES

BY

PRIESTLEY SMITH,

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IN a paper on the "Limitations of the Tonometer," published in 1915[1]; I ventured to point out that many users of the Schiötz tonometer were attributing to that excellent instrument a degree of precision in the measurement of intra-ocular pressure which its author had never claimed for it, and which no such instrument can ever possibly achieve. I return to the subject for a different reason. A recent and important article by McClean, of New York[2], throws much doubt on the indications of the Schiötz tonometer. My own experiments suggested that the Schiötz curve underestimates the intra-ocular pressure at ordinary levels by about 5 mm. Hg.; Dr. McClean's go much further, for they appear to show that the instrument underestimates it at all levels and by much larger amounts. His tests were numerous and were evidently made with elaborate care, but it seems to me that his results, as they stand, are not conclusive. They differ widely from those obtained by Prof. Schiötz, and from my own, and can hardly be accepted until the causes of the discrepancy are explained.

Principle of Eye-tonometry.—A tonometer, however perfect, cannot directly *measure* the intra-ocular pressure. It can only measure the impressibility of the eyeball, and this the Schiötz instrument, when skilfully used, does admirably. We *infer* the intra-ocular pressure from the impressibility of the eye, but the result involves uncertainty, for the degree of impressibility depends not only on the height of the internal pressure but also to some extent on the character of the eye-ball—on its extensibility, its pliability, its curvature, and so forth. Hence it happens—and this has been proved by experiment—that eyes giving the same tonometric readings may have different internal pressures, and that eyes giving different readings may have the same internal pressure. The detailed tables originally given by Prof. Schiötz, and my own also, give ample proof that considerable errors *must* sometimes arise in this way. The following experiment of my own illustrates the point in an exaggerated way:

A pig's eye was tested with the Schiötz tonometer under three different conditions: first, immediately after its removal from a pig just killed; again after it had lain 3½ hours in normal saline with formalin 5 per cent.; and again after a further 20 hours in the same

fluid. In each case the intraocular pressure, as established by a manometer, was 25 mm. Hg.

		mm Hg.
Pig's eye, fresh	Actual pressure (manometer)	25
„ „	Inferred pressure (Schiötz)	22·5
Same eye, after 3½ hours' treatment		30
„ after 23 hours' treatment		61

The formalin, of course, stiffened the tissues, diminished the impressibility of the eye, and falsified the mercury equivalents given by the Schiötz curve.

That tonometric measurements are inevitably beset by a margin of error—we do not yet know its width—is unfortunately often overlooked. Many suppose that a first-class instrument, well graduated and skilfully used, should measure the pressure in the eye as accurately as a thermometer measures the temperature of the blood. They forget that its action is *indirect*. Perhaps a rough illustration will be useful: The height of a child increases with its age, but the relation of height to age, among children, is not constant. We have tables, carefully prepared from numerous observations, that tell us the *average* relation, but if an enquirer, having provided himself with such a table, should attempt to ascertain the ages of individual children by measuring them, he would make some big mistakes, even though armed with the best measuring stick in the world.

Average equivalents of tonometer degrees, and how they are obtained.—But though the degrees on the tonometer bear no constant relation to intra-ocular pressures, there is certainly an *average* relation, if it can be found ; each degree, on the average of many eyes, has an equivalent in mm. Hg. Such average equivalents can be presented in the form of a table or curve, or may be indicated on the scale of the instrument, and are valuable so long as it is remembered that in the case of any individual eye they may be incorrect by a good many mm. Hg. The difficulty is to determine them.

They are obtained by experimenting with the tonometer and a manometer simultaneously. The principle is simple enough, but its execution needs close attention to many details, and at the best it is impossible to make the tests under conditions precisely like those of the undisturbed living eye. Essentially the method is as follows:

The manometer, preferably measuring with water rather than mercury, is connected with an eye by means of a hollow needle, or canula, entering the vitreous chamber ; a known pressure is established in the eye ; the connecting tube is then closed, and the tonometer is at once placed on the cornea ; its reading is recorded. This reading corresponds with that pressure—in that eye. In the same eye other pressures are then established, proceeding from the

lower to the higher, and a reading is obtained for each. The whole proceeding is repeated on a number of eyes. Lastly, the average of the readings obtained for each pressure is found.

What the clinician wants to know, be it remembered, is *the pressure which is present in the eye before the tonometer is placed ubon it*, and it is the relation of this to the scale of the instrument that the experimenter ascertains—as nearly as he can—by proceeding as above stated. Of course, the weight of the tonometer, when it is on a patient's eye, raises the intra-ocular pressure above its previous level, and the higher the previous level the more does it raise it, but that need not concern us, for it is the *previous* and not the *modified* pressure that we want to know.

Are the Schiötz curves correct?—Prof. Schiötz obtained his data by experimenting, essentially as above described, on eight excised human eyes, and he published his results in detail.[8] Seeing that the relation of the tonometer degrees to the intra-ocular pressures varied materially in different eyes, one may suppose that if more eyes had been tested the averages might have worked out a little differently. Also, seeing that these eyes were dead and that they were removed from their natural surroundings, one may doubt whether the findings are strictly applicable to living eyes. In view of these uncertainties, Prof. Schiötz expressly offered his figures as *approximate* equivalents, and in his subsequent tonometric work did not translate his findings into mm. Hg. He is therefore not responsible if others have attached too precise a value to his curves.

My own experiments were undertaken to test the correctness of the Schiötz tonometer and its chart in the region of normal intra-ocular pressures. Until a few years ago the normal pressure was supposed to be about 25 mm. Hg. (Leber),[4] this figure being in accordance with many manometric tests in animals, with a single such test in a healthy human eye,[5] and with the average of many observations with the Maklakoff tonometer.[6] The advent of "the Schiötz" made it possible to measure the impressibility of the eye with much greater precision than theretofore, and in course of time a careful observer,[7] having found that 1,000 healthy eyes tested by himself gave an average reading of 4·3 degrees, declared the average pressure in healthy eyes to be 20 mm. Hg., this being the Schiötz equivalent for that reading. But is the Schiötz curve correct?

After some preparatory trials, I experimented in the way already described, first on eight fresh excised pigs' eyes, and then on twelve human eyes remaining in the orbit after death. In each case four different water-pressures were used. The tonometer had been tested by Prof. Schiötz. The findings were published in detail.[1] In the following summary water-pressures are translated into their mercury equivalents :

		mm. Hg.	mm. Hg.	mm. Hg.	mm. Hg.
	Manometer	17·6	25	32·4	39·7
Pigs' eyes, excised	Schiötz tonometer	18	25	32	38·5
Human eyes, in orbit	„ „	13	21	29·5	40

It will be seen that the tonometer indicated the internal pressures in the pigs' eyes remarkably well, in other words that the Schiötz curve, orginally obtained by experimenting on *excised* human eyes, proved practically correct for *excised* pigs' eyes. On the other hand, it proved to be somewhat incorrect for human eyes that were *not excised*, especially with low pressures; with the 4 pressures the errors were 4·5, 4, 2·9, and 0·3 mm. Hg., respectively. I think the discrepancy can be reasonably explained.

The eyes on which a tonometer is originally regulated (*i.e.*, graduated, curves constructed, &c.), should resemble those which it is subsequently to test, or its clinical indications are likely to be incorrect. The point is rather subtle but a little consideration will show that a tonometer which has been correctly regulated on eyes whose envelopes are of average extensibility will *overstate* the pressure in an eye whose envelope is relatively inextensible; while if it was regulated on eyes of less than average extensibility, it will *understate* the pressure in the average eye. Now there is reason to suppose that with equal internal pressures, and especially when these are low, excised eyes are somewhat less extensible than eyes remaining in the orbit. I quote the following from my earlier paper:

"In the orbit the sclera is to some extent supported from without by the soft cushion in which it lies, and is therefore less fully expanded by a given internal pressure than is the sclera of an excised eye; hence under the weight of the tonometer it is able to yield a little more—the fluid displaced by the tonometer is accommodated more easily, the impression is deeper. The difference will be more pronounced when the pressure is low in the eye than when it is high, for in the former case it will differ comparatively little from that of the orbital tissues and will be borne by them to a considerable extent, whereas in the latter it will be much the higher of the two and will be borne in larger proportion by the sclera itself. In an excised eye it is borne entirely by the sclera. This would explain the fact that the averages compared above differ less and less as the pressure rises."

If the foregoing explanation be true the small discrepancy between my own results and those of Professor Schiötz is explained, and it is probable that the Schiötz curve, in the neighbourhood of normal pressures puts the pressure lower than it really is. I suggest, moreover, that if we could accurately compare eyes remaining in the orbit after death with living eyes, this error in the Schiötz curve would prove to be somewhat greater than it here appears.

Now McClean experimented not only on excised eyes, but also on living eyes of rabbits and dogs under ether, and on three living human eyes immediately before their removal for incurable glaucoma. He used the tonometer and manometer together in many cases. The results are interesting in many ways. Let us consider those bearing on the correctness of the Schiötz tonometer. It seems that in every case the tonometer put the intraocular pressure below its actual level, and as the discrepancies are too constant and too great to have arisen through exceptional peculiarities in the eyes examined, one can only hope to explain them by comparing McClean's material and methods with those which Schiötz employed in the regulation of his instrument, *i.e.*, in constructing his curves. First as to the material.

McClean records five experiments on living rabbits, with nearly similar results, here is the first in brief:

Rabbit's eye, No. 1,	cocaine, no ether.	Schiötz tonometer	17·5
„ „	ether anaesthesia		12
„ „	after introduction of canula into anterior chamber, ether continuing ...	Manometer	33
„ „	anaesthesia deeper		22
„ „	consciousness beginning to return ...		30

In this case, the manipulation on introducing the canula may perhaps have raised the intraocular pressure in some degree after the tonometric reading was taken, but one can hardly doubt that the original pressure was greater than shown by the tonometer. Yet we must not hastily blame the latter. The Schiötz tonometer was regulated on human eyes. The experiment does not show that it is untrue for human eyes. Until it has been proved that a man's eye and a rabbit's eye, with equal internal pressures, give equal tonometric readings, we must not expect any tonometer to be true for both. According to my own experiments, excised *pigs'* eyes do nearly resemble excised human eyes in their reaction to the tonometer, at least at moderate pressure-levels, but I know of no accurate comparative tests with regard to other animals.

Another of McClean's records relates to dogs' eyes and shows that in these also the Schiötz tonometer put the intraocular pressure a good deal lower than it really was. The same criticism applies: the tonometer was not regulated on dogs' eyes; though wrong for these it may be right for human eyes. Such evidence does not prove the instrument to be at fault.

The results of his experiments on human eyes are more disconcerting. He tested a Schiötz tonometer against a manometer on three living eyes blinded by glaucoma, under ether anaesthesia, immediately before their removal, and repeated the test on one of

them after its removal. Here are some of the figures from the double test:

			mm. Hg.	mm. Hg.
Human eye, living, glaucomatous, under ether.				
		Manometer ...	65	54
" " " "		Schiötz tonometer	50	43
Same eye, excised.	Manometer ...	50 40	30	20
" " "	Schiötz tonometer	35 22	16	7.5

These are large discrepancies; what is the explanation? Is it that McClean tested the tonometer on living eyes whereas Schiötz regulated it on dead ones? No, for McClean tested it also on a living eye and it made the same mistakes. Is it that, with equal internal pressures, eyes blinded by glaucoma have less resilient envelopes than ordinary eyes artificially made tense? No, for the tonometer would relatively *over*-state the pressure in the stiffer-walled eyes, and here it did the reverse.

Take a single one of these discrepancies and realise what it means. Schiötz established a pressure of 40 mm. Hg. in 8 eyes, applied his tonometer, noted the average position of the pointer, and made his chart agree therewith. I set up the same pressure in 12 eyes, applied a Schiötz tonometer, averaged the readings, and translated the result by the chart; it spoke correctly: the average reading indicated 40 mm. Hg. McClean set up this same pressure in the eye in question, applied the tonometer, and referred to the chart; it made a big mistake: it indicated 22 mm. Hg. instead of 40. Surely, his method of experimenting must have differed in some essential way from that employed by Schiötz, and by myself. I will venture to suggest a possibility.

In many of his experiments McClean used a well-known method of control. A long horizontal glass tube, finely graduated and of small bore, is interposed between the manometer and the canula; an air bubble in the tube makes visible any movement of the water-column. When the bubble moves towards the manometer we know that the intraocular pressure is greater than the manometric, and that fluid is passing out of the eye through the canula; and vice versa. Now, when the manometer is used for the purpose of measuring the pressure in a living eye this control is indispensable; the tube being open and the bubble stationary, the experimenter knows that the intraocular pressure is exactly equal to that indicated by the manometer. On the other hand, when the purpose is to test a tonometer against a known intra-ocular pressure, ***the tube must be closed before the tonometer is placed upon the eye,*** or the test will be vitiated.

Consider what happens if the tube remains open. The weight of the tonometer forces fluid out of the eye through the canula and drives the bubble backwards until the intraocular pressure is again

equal to the manometric. The intraocular pressure therewith resumes its previous level, instead of remaining raised (*modified*) as in ordinary tests, for the amount of water driven out is too small to raise the water-level in the manometer in any discoverable degree. The tonometer, therefore, makes a larger and deeper pit in the cornea than in an ordinary test: the test is vitiated by the escape of fluid through the canula. It is true that the experimenter can prevent the escape, if he care to do so, by raising the manometric pressure sufficiently to hold the bubble in its original position. The manometer will then again measure the intra-ocular pressure. But what is it now measuring? Not the *previous* pressure, which is what he wants to know, but the *modified* pressure which is considerably higher, and with which he has no concern.

If McClean, in testing the Schiötz tonometer, left the tube open when the instrument was on the eye, and prevented displacement of the bubble by raising his manometric pressure, the discrepancies are to a large extent accounted for. If not, my suggestion fails, and another explanation must be sought. Unfortunately he leaves us in doubt on this crucial point. He speaks of using a stop-tap in one form of his apparatus, and of closing it before applying the tonometer, but with regard to the patency of the control-tube in the experiments here in question he says nothing. We want that information.

Summary.—The Schiötz tonometer measures the impressibility of the eye and can indicate *changes* of intra-ocular pressure in a given eye with a great certainty. For example, it has proved (see McClean's experiments) that in animals and in man, and that in glaucomatous as well as in healthy eyes, the intra-ocular pressure falls considerably during the introduction of ether anaesthesia.

The tonometer cannot measure the intra-ocular pressure with precision because the relation of the impressibility of the eye to the intra-ocular pressure is different in different eyes. In other words, exact mercury equivalents for the degrees indicated by the pointer cannot be given.

Approximate mercury equivalents are found by testing a number of human eyes with the tonometer and a manometer almost simultaneously. It is not possible, however, to carry out the test under conditions quite like those under which the tonometer is ordinarily used. Equivalents found by experimenting on animal eyes are likely to be incorrect for human eyes.

The value of any new tonometer will depend not merely on the excellence of its mechanism, but also, and essentially, on the tests by which it was regulated. Full details of the method and of the results should be given.

The Schiötz curves are not likely to be precisely correct, even for the average living eye, for the reasons just given. They are

necessarily sometimes at fault for the individual eye. On the other hand, it is not proved, and it is not likely, that the instrument errs to the extent that McClean's experiments suggest.

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HOMONYMOUS HEMIANOPIA OCCURRING IN A CASE OF MALIGNANT MALARIA

BY

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THE following case is, I think, worthy of record, because I can find no previous mention of a similar one:

Lieut. W., aged 28, admitted into hospital suffering from malignant malaria; was sent to see me because of defective vision on June 6, 1918. He walked into the room and I noticed that he walked like a man who had very defective vision, holding his hands rather far stretched out and with his eyes widely open and staring. In answer to the question as to what he complained of, he said that his sight had gone; he could not see where he was going, and it was as though he were "shut in at the sides." He told me that he had come down the line with malaria and had had numerous injections of quinine en route. When I heard this I thought to myself at last here is a case of quinine amblyopia. (NOTE.—I have still to meet one here—after over three years of ophthalmic work and with thousands of cases of malaria and hundreds of thousands of men taking quinine, there has been no case of quinine amblyopia, and neither have I heard of one at any of the other hospitals.) However, on further questioning him he stated, with many pauses for recollection, that on May 23, when he got out of bed to wash, he suddenly felt as though he had been struck between the eyes and had a severe pain in the head right through to the back (occipital region), and found that he could not see properly and had not been able to since. He remembers nothing clearly from that time onwards until six days later on May 29, when he remembers being carried into hospital at Kantara, and has remembered things that happened after this. And from a statement by a friend who was in hospital with him he was "delirious" during this period.

The history of the early part of his illness was as follows:

While in the firing line in Palestine he "felt queer, and his legs gave way under him" and as he happened to be near the M.O.'s. hut he called in to see whether he could get any medicine. The Medical Officer found that he had a temperature of 102 degrees, and sent him to hospital. The following particulars are obtained from his field card notes: "Admitted to hospital May 18, '18, temperature 101·4 degrees. Blood examination showed malignant malarial parasites; intramuscular injection of quinine bi-hydrochloride gr. x. was given.

May 19, '18.—Temperature 101·2°. Quinine sulphate gr. x., t.d. by mouth and further 10 grains quinine bi-hydrochloride intramuscularly,

May 20, '18.—Temperature 99·2°. Intramuscular injection of quinine bi-hydrochloride gr. x. and quinine sulphate gr. x., t.d. by mouth and also on May 21, '18.

May 22, 18.—Note states: T. 100°. Pulse 80. Spleen, not felt. Liver, not enlarged. Skin red and marked dermatographia. Bowels constipated, but no cerebral signs. Quinine sulphate gr. x., t.d. and calomel and salts by mouth given.

May 24, '18.—Temperature keeps up—further intramuscular quinine gr. x. given and also on May 25, '18.

May 28, '18.—Temperature now satisfactory. Quinine only by mouth.

On examination.—The pupils were round, rather wider than normal, but contracted in a bright light although not briskly—the right one reacting more sluggishly than left.

Visual acuity.—R. 6/24, not improved. L. 6/36 partly, not improved. Reads J.6 with difficulty, having to pick out all the letters first. *Fundi* both healthy in appearance, vessels normal in calibre and discs of good colour. *Fields* show right homonymous hemianopia absolute and complete for colours and white; no movement or form sense or perception of light in the blank areas. *Wernicke reaction* not determinate.

Further examination a few days later brought out the following facts:

No history of a previous illness, and his sight has always been perfect; in fact, he was a "marksman." He had been using a mosquito net when taken ill, but had had no prophylactic quinine. He says he now feels fit, except that he has a heavy aching of the head across the brows and at the back as though something were tied tightly around his head. He states that he cannot explain things well as his memory has become bad and he cannot think clearly. He has difficulty in recalling events that have happened at any period of his life (for instance, he took nearly ten minutes to remember what his occupation was previous to the war), and the

deficiency is most marked for the period of the last few weeks. He speaks clearly, but rather jerkily, and apparently gets sudden flashes of memory of past events, and tells me at once before he forgets, which he does very easily. He says that it feels too much effort to think about anything, and he feels that he is likely to repeat his words. He has no difficulty in explaining the meaning of words read and can describe objects seen or touched. He finds trouble in spelling long words, but can spell short ones readily, and he can tell the time by a watch when told which is the short hand and which is the long one, and can do arithmetic. He is rather depressed, but he looks well nourished and not ill. He has no visual hallucinations. His urine is normal, Wassermann reaction is negative, and blood films show no malarial parasites, but marked excess of mononuclear leucocytes. Pupil reactions as before, ocular movements full, no nystagmus. There is marked tremor of his hands. Patchy anaesthesia of face and head, mostly on left side, and there is a patch of hyperaesthesia on left side of external occipital protuberance—otherwise there are no painful points. The cranial nerves are intact, knee jerks are normal, Babinski negative, and no Kernig's sign. There is no loss of power in his limbs, but there is marked defective sense of orientation in localizing the position of hand and foot (of right side) when these are placed in different positions.

In considering the situation of the lesion in this case, there are four points to be taken into account. These are:

1. Presence of R. complete homonymous hemianopia.
2. Diminution of central visual acuity,
3. Disturbance of peripheral sensation.
4. The loss of sense of localization of the limbs of right side of body.

These facts suggest a lesion of the brain near the angular and supramarginal gyri and the posterior part of the internal capsule (optic radiations) on the L. side. The sudden onset suggests a vascular lesion and the presence of malignant malaria with cerebral symptoms that a blockage by malarial parasites of a vessel or vessels in this part of the brain may be the cause of the symptoms.

SOME STATISTICS OF MYOPIA IN SCHOOL CHILDREN; WITH REMARKS THEREON

BY

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MYOPIA is a mysterious disease, perhaps as mysterious as glaucoma in the matter of aetiology.

We talk of school myopia, hereditary myopia, congenital myopia. What, for instance, is meant by school myopia? This term seems to have no very precise meaning, since, while admitting the common onset of myopia during the educational period, one finds cases in which there is distinct heredity, and others in which there is no trace of it. If there is no hereditary tendency to actual myopia in any given case, what is the precise causative factor in that case? Is there, indeed, any one factor? The possible factors are numerous enough; convergence strain, bad lighting, bad hygiene, physical strain (Edridge-Green), weakness of the sclerotic, and so on. But to what extent each or any of these or other factors may be responsible for the onset of myopia no one is able to say. It has been held that the essential cause is weakness of the sclera caused by tubercle. To me this is rather an attractive hypothesis, for although it has not yet been possible to correlate my myopia statistics with the incidence of tubercle in the various districts in the County of Lanark, there is at least a suggestion in them pointing in the direction of parallelism between myopia incidence and a tendency to "strumous" affections.

Meantime, it is intended merely to emphasize certain facts which my statistics seem to bring out, not to discuss various theories of the aetiology,

The school area with which I have to deal is a wide one, including as it does the County of Lanark exclusive of certain districts, and, of course, exclusive of the City of Glasgow. Lanark is a large and populous county in which agriculture, coal mining, and industry are much mixed together. It is comparatively easy to define the larger urban districts and to say that here the population is purely industrial, but it is less easy to define the country districts in many of which there are coal pits and small towns in which industries are carried on. Nevertheless it is possible to make a rough division of all the districts into urban and rural and also to pick out certain of them which may be called urban, rural, and mixed respectively.

(1) It has at various times been stated that myopia is less common in the country than in the town, that it is a disease of the educated, of those who use their eyes largely at close range. The

statement has been made that the country dweller is not prone to myopia because he uses the eyes for distance. Yet my figures, small and imperfect as they are, do not lend support to this view. They show that *in so far as concerns the children in the County of Lanark who apply for treatment under the voluntary scheme of the Education Authority*, those attending rural schools present a higher percentage of myopia and myopic astigmatism in one or both eyes than those attending urban schools. The words italicised must be carefully noted, for the war has prevented the natural expansion of the Authority's scheme, which, under normal conditions, would doubtless ere this have reached out to cover an enquiry into the visual conditions of *all* the school children in the County. That this will eventually be done I have very little doubt. Meantime, the figures may be taken for what they are worth.

During the period from August, 1914, to July, 1917, I personally examined 3,249 children. Of these, 612 had myopia or myopic astigmatism in one or both eyes, that is 18·8 per cent. But, if the districts are separated into two main classes, urban and rural, it is found that of 2,655 urban cases 468, or 17.6 per cent., were myopic; while of 594 rural cases 144 or 24·2 per cent. were myopic. The disproportion between the numbers of urban and rural cases examined is a weak point statistically, yet the calculation has been made for each year separately as well as in the aggregate, and the proportion of myopia has been consistently higher in the rural group.

On account of the difficulty of deciding in certain areas whether these should be classed as urban or rural, the figures have been worked out in another way. Certain districts difficult to classify were omitted from the calculation. Four districts were selected as practically purely urban industrial, three as practically purely agricultural, and four as mixed agricultural, mining and industrial. In the main classification into urban and rural, the second and third groups of selected districts (see table), belong to the rural division.

Continuing to deal with these selected groups of districts, it was found that in the urban group 1,561 cases gave 269 myopias, or 17·23 per cent. In the agricultural group 229 cases gave 47 myopias or 20·52 per cent. In the mixed group 365 cases gave 97 myopias or 26·57 per cent. (see table). In all cases the figures refer to myopia or myopic astigmatism in one or both eyes. Except in complicated cases refraction has been estimated by retinoscopy under atropin and cocain.

From these figures it is probably not unreasonable to conclude that in the County of Lanark the children of agriculture are not less myopic than the children of industry, and that it looks as if the children of the miner are more subject to myopia than those of the other two classes. Here is wide scope for the investigation of the

hygiene of the school and of the home (the latter concerning parent as well as child), the lighting conditions of both, and the prevalence of particular diseases, especially tubercle. As has been remarked previously, the figures are pointers only, and may perhaps suggest statistics from other workers in the same field.

If the conclusion here indicated be admitted, we are still left to ponder upon the questions of heredity, of home and school environment, and of other possible factors, as causes of myopia.

It has not been possible, in the meantime, to investigate the presence or absence of heredity in each case, but undoubtedly the part played by it is very uncertain. Cases of high and dangerous myopia occur in children whose parents and other accessible relatives are not myopic, while, in others, there is undoubted heredity. It has been suggested, I think, that weakness of the sclerotic is the transmitted factor in cases where the parents are not themselves myopic. Is the cause of the weakness tubercle, syphilis, or consanguinity ?

Home and school environment is a very large question, also open for investigation in the future which is coming to us with the end of the war and the consolidation of educational authorities. Undoubtedly, the home environment of some of the workers in agricultural and mining districts in Scotland is very bad indeed. On the other hand, nothing could well be worse than the lighting conditions in some of the urban schools.

The following family history illustrates very well the impossibility of fixing the blame on either heredity or school work in a given case. This family *apparently* has a hereditary tendency to myopia, yet there is no myopia in the parents, or ascendants generally, so far as is known to the mother. On the other hand, James L. had 20 dioptres of myopia at 5 years of age.

James L., aged 5 years. Myopia approximately 20 D. in each eye. Fundus changes incommensurate with the amount of myopia. At 7 years the V. was R.E.—16 D.=5/24. L.E.—18 D.=5/60. Alternating convergent squint. Child backward and shy, but improving in these respects.

John L., aged 10 years. Right eye emmetropic. Left eye myopic 4 D. Convergent squint, amblyopia. Formerly had acute phlyctenular disease.

Grace L., aged 12 years. Right eye myopic astigmatism. Highest meridian 11 D. Left eye myopic 14 D. Marked fundus changes. Eventually V.R. 5/6, L. 5/18. No squint.

In this family the mother was quite intelligent, and had herself sought for a hereditary cause and found none whatever. Out of 6 eyes in 3 children 1 eye entirely escaped myopia, although the mean of the other 5 eyes was no less than 13·8 D, while the mean of the ages was only 9 years.

In addition to the various fields of statistical enquiry which have been here suggested, and which it is possible in the future I may be in a position to enter, there is another, the outlines of which are still vague. It has been borne in upon me in the course of my dealings with children belonging to different districts of the county, in taking spectacle frame measurements, that there is some evidence of *local* variation in the type of face and skull, as shown by a predominant type of nose, and perhaps also of interocular width, and of length from ear to orbit margin, in children of similar ages. I do not know what bearing this might have if worked out in careful detail. It is certainly the fact that in the mining districts especially there is a non-British element. By no means all of these people retain their original names. John Smith may quite well have been born, let us say, Kalewski, a fact which renders investigation more difficult than otherwise it might be.

(2) The next point taken up statistically is the *mean myopia* in the different districts. This has been calculated in the selected districts already referred to, and tabulated along with the percentage of myopia (see Table). The procedure adopted was to add together the highest meridians of myopia in all the myopic children examined in each district, and to divide the sum by the number of myopic children, thus obtaining the mean highest meridian. This was done separately for each eye. In cases of anisometropia, one eye myopic, the other non-myopic, the non-myopic (including mixed astigmatism) eye was left out of the addition, but counted one in ascertaining the mean. For example, to take an imaginary district with only four children:

	Highest Meridian.	
	Right	Left
	9	7
	Mixed	4
	0·5	H
	E	1·0
	4)9·5	4)12·0
Mean myopia	2·37	3·0

The result of this investigation (see Table) does not seem to point to any striking difference between the mean myopia in the urban and rural districts respectively. One very decidedly rural district (Abington, etc.), certainly has a higher mean than any other, though Lanark, a mixed district, is not very far behind.

There is a quite noticeable tendency for the mean myopia to be higher in the right than in the left eye. In each group of districts the mean of means is higher for the right eye, but the difference is more obvious in looking at the results for the individual districts.

In only two out of the eleven has the left eye a higher mean than the right. If all the means be added together and divided by three the right eye shows 4·04 and the left 3·53.

One is probably justified in saying that there is no evidence of any particular difference in the type of myopia in the urban and rural districts respectively. Neither has a monopoly of the high type. In actual practice I have found this type scattered about impartially, so far as I could judge, and the statistical method at least confirms this impression. It is to be noted nevertheless that on balance the urban districts have a tendency to a lower mean than the other two types of district, though in view of the disparity of the numbers of cases seen in the three types of district one hesitates to trust the figures too far.

The apparent tendency, one can put it no higher, for the myopia to be greater in the right eye than in the left is interesting and suggestive, nothing more. Further statistical enquiry is necessary before such predominance could be proved. Here, again, I would appeal to other workers. The whole subject of myopia in children demands immense figures obtained by trained oculists and these figures will in time be forthcoming.

(3) ***Squint in myopic children.***—It is commonly accepted that divergent strabismus is the ordinary type of squint in myopia. In his article "The Cause and Prevention of Myopia" (*Lancet*, Jan. 26, 1918), Edridge-Green makes the following statement: "In convergence excess, as in convergent strabismus or internal squint, myopia is *not* produced and convergent strabismus is almost exclusively found in hypermetropic eyes." In this short statistical report I am not concerned to discuss this or that theory of myopia, but the latter part of the statement just quoted is so contrary to the facts as I have observed them *for children*, that it is advisable to set down my own statistics. These extend over a somewhat longer period than those already given for myopia itself. The records of 790 myopes have been analysed, and may be synopsized as follows:

Total squints noted 65, doubtful 9.

Divergent Squint			
Left eye	14		
Right „	11	=27, plus 2 doubtful, ...	29
Alternating	2		
Convergent Squint			
Left eye	20		
Right „	16	=38, plus 7 doubtful, ...	45
Alternating	2		
Percentage of divergent taken as 29			3·67
„ „ convergent „ „ 45			5·69

If the doubtful cases be omitted the excess of convergent over divergent squints will be a little smaller.

It may be suggested that I have mistaken the effect of the angle gamma for convergent squint. One might grant the possibility for the cases recorded as doubtful, but to one who is aware of the existence of the angle gamma a mistake is not very probable in the others. I think it must be accepted that in the 790 myopic school children (some myopic in only one eye, as has been stated already), convergent squint was not only not less frequent, but was actually more frequent than divergent. I am free to admit that my records of exophoria are not trustworthy, and therefore they have not been stated.

The preponderance of left eye squint will be noted. This is quite in harmony with what I find, statistically, to occur when convergent squint is noted over all conditions of refraction. I am incapable at the moment of giving the exact figures, but, basing upon an approximate calculation taken over two years statistics, I should place left squints at 53 per cent., right squints at 39 per cent., and alternating squints at 8 per cent.

It appears, then, as regards these children that (1) convergent squint in myopia is commoner than divergent, (2) In convergent squint, under all conditions of refraction taken together, and including the specially investigated case of myopia and myopic astigmatism, the left eye is involved more often than the right eye. Whether or not this is the common experience I am unaware.

Leaving on one side the question as to which eye is involved more often, which may be regarded as "another story," is not the excess of convergent over divergent squint in myopic children rather what one would expect? It is a common observation that the number of squinting adults is relatively smaller than that of squinting children. If every (convergent) squinting child grew up with a squint 27·4 per cent. of people on the street might be squinters! A great many convergent squints become cured as regards the deformity. It is easy to suppose that in myopic children a convergent squint often gives place, as in other conditions of refraction, to approximate orthophoria. This ultimately changes to divergence, thus accounting for the presumed greater number of divergent squints in myopic adults.

In any case, and this is the main point, the statement of Edridge-Green, which probably voices a common opinion, seems open to question in view of the statistics which have been given here; and if the statement as applied to children proves to be as incorrect as my results seem to show, then it is useless as part of the foundation for an argument as to the aetiology of a disease which usually commences in childhood.

I trust it may be possible for some other workers to confirm or

refute the few results given in this brief record, and to carry forward investigations on myopia in school children in various localities which may throw light on the aetiology of this disease. The field is a large one and up to now has not been explored, so far as I know, on any great scale in this country. Expert inspection of the eye conditions of *all* school children at entry is the first desideratum. Ordinary Medical Inspection, by a School Medical Officer who has not the training of an oculist, is of comparatively little service. Systematic and comprehensive enquiry into home and school conditions is also most important, and it would be surprising if two such sets of statistics on a large scale did not afford mutual illumination.

TABLE SHOWING THE PERCENTAGE OF MYOPIA AND THE MEAN OF THE HIGHEST MERIDIANS IN CERTAIN SELECTED DISTRICTS OF THE COUNTY OF LANARK.

District.	Children examined.	Per cent. Myopic Children.	Mean of Highest Meridian. R.	Mean of Highest Meridian. L.	Nature of District with respect to Occupations.
Coatbridge ...	481	18·08	4·16	3·48	Almost purely urban.
Motherwell ...	419	15·03	4·18	3·72	Almost purely urban.
Rutherglen ...	291	17·86	3·30	2·88	Almost purely urban.
Shettleston ...	370	18·10	3·73	3·29	Almost purely urban.
	1,561	17·23	3·84 Mean	3·34 of Means.	
Abington, Biggar and Carnwath	62	27.41	5.48	5·37	Almost purely agricultural.
Cadder ...	85	16·47	3·30	1·35	Almost purely agricultural
Strathaven and East Kilbride	82	19·51	3·86	2·75	Purely agricultural.
	229	20·52	4·21 Mean	3.15 of Means.	
Carluke ...	59	35·59	4·42	3·87	Agriculture, Mining, Manufacture.
Lanark ...	119	31·92	4·93	4·81	Agriculture, Mining, Manufacture.
Lesmahagow ...	40	30·00	4·20	4·75	Agriculture and Mining.
Shotts ...	147	17·68	2·94	3·00	Agriculture, Mining, Iron smelting.
	365	26·57	4.12 Mean	4·10 of Means.	

I have not ventured to bring forward statistics bearing upon treatment. In a voluntary scheme it is not possible to follow up every child until he or she leaves school. Even when the myope is

caught young and the parents are willing and intelligent people, the process of following the case through to the end of school life involves years. In the case of Lanarkshire children under my care a sufficient length of time has not yet elapsed for the statistical record of children treated and followed through to be of much value. Further, owing to the present voluntary nature of the scheme very many cases have only been examined late in school life and have escaped from observation after the first or second attendance. We have as yet no special myopia schools in the County of Lanark apart from Glasgow. It is to be hoped that these will come later on when the new education authority gets fairly to work.

NOTES ON A CASE OF ANOMALOUS INNERVATION OF THE LEVATOR PALPEBRAE SUPERIORIS (LEFT)

BY

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A. E. C., aged 44, A.B., admitted to P.H. in June, 1918, was found on examination of his extrinsic muscles, to present the following abnormality, viz., that on looking down and to the right the left levator palpebrae superioris was thrown into action as represented in Fig. 1.

The extraordinary aspect called for verification by repeated tests, and on every occasion the same appearance presented when looking in the direction stated. More detailed examination revealed, further, that on extreme rotation to the right, on a level with the eyes, the left levator came into action and increasingly so, as the eyes were rotated to the right. This is represented in Fig. 2.

The position of the left upper lid was then more minutely investigated when the eyes were turned in the directions mentioned below, with the following results:

	Direction of Eyes.	*Position of Left Upper Lid.*
	1. To the right and up.	Similar to the right.
Up.	2. Straight up.	Similar to the right,
	3. Up and to the left.	Similar to the right.
	4. To the right.	Distinctly elevated
Level.	5. Straight ahead.	Similar to the right.
	6. To the left.	Slightly lower than right.
	7. On convergence.	Similar to the right.

	8. Straight down.	Slightly higher than right.
Down.	9. Down and to right.	Markedly elevated.
	10. Down and to the left.	No marked difference from right.

I regret that, through oversight, there is no indication of the exact position, on minute examination, of the left upper lid as compared

FIG. 1. Test No. 9.
Looking down and to the right.

FIG. 2. Test No. 4.
To the right on a level with his own eyes.

with the right, when the gaze was directed down and to the left. Tests frequently repeated when the abnormality was first observed, however, render it certain there was no marked difference from the right.

Visual acuity unaided R. and L. each 6/24. With correction R.V. 6/9 partly, L.V. 6/9.

Diplopia none and no evidence of strabismus. One candle only seen when patient tested in dark room with a pair of red and green spectacles.

Some esophoria was present, the distance between the spot and the line of light with the Maddox rod at a distance of nine feet varying from five to eight inches. The discs were congested and their margins not well differentiated from the surrounding fundus. The fields were slightly contracted on the temporal sides. Syphilis in 1895, but the anomaly of extrinsic muscles was remarked upon by his family, prior to that date.

The difference in width between the right and the left interpalpebral spaces was most marked in test No. 9 (Fig. 1). Very much less marked in test No. 4 (Fig. 2), and the difference between the right and left spaces in tests 6 and 8, whilst distinct, was very slight in degree, and was only discerned after minute inspection. Photographs would have been of very doubtful value in these cases.

On July 16, I find this note confirming previous examination: "There can be no doubt whatever, that on rotation of his eyes to the right on a level with his own eyes, the left levator palpebrae superioris comes into action distinctly and the interpalpebral space in the left eye is considerably greater than in the right. If the object fixed by the patient be now lowered to a position down and to the right, the difference in width between the right and the left interpalpebral spaces becomes much more accentuated, but this seems entirely due to the drooping of the right upper lid rather than to any further elevation of the left."

Fig. No. 2 seems less marked than the actual, but even as it is measurement as between the right and the left interpalpebral spaces is conclusive as is also the manner in which the tarsal border of the left upper lid is tucked up under the fold of skin above, as compared with the right. As to aetiology, I was at first disposed to regard the case as one of anomalous innervation of the levator palpebrae from the fourth nerve as additional to the usual innervation, elevation occurring when the l. sup. oblique came into action, but the emphatic statement quoted above on July 16 leaves me less assured. The constant elevation of the left lid whenever the left internal rectus comes into play strongly suggests anomalous innervation from that branch of the inferior division of the third nerve

supplying the internal rectus. This, however, seems less likely anatomically.

The case was first discovered in the course of routine examination of extrinsic muscles in the eight cardinal directions, and the extraordinary appearance of the patient on looking down and to the right at once arrested attention (Fig. 1).

It is perhaps not surprising that the facts relative to Fig. 2 were only discovered on minute investigation. At first routine examination the elevation was overlooked.

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ARTIFICIALLY PRODUCED OPHTHALMIA

BY

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This is a condition commonly found amongst Indian troops and followers in the Mesopotamian Expeditionary Force. During the year 1917-18 there were 136 cases recorded, whilst during the same period amongst Indians there were 500 cases of conjunctivitis and 554 of trachoma. The substances mostly used for its production are jequirity, croton oil, and castor oil seeds. On searching the patient's kit we have found all these varieties of seeds, but most frequently jequirity. Most medical men are acquainted with the appearance of castor oil and croton oil seeds, but many, unless they have resided in the East, may not be familiar with jequirity. It is a red seed about the size of a small pea with a little black spot on it and is used by Indian jewellers as a weight. All the above-mentioned seeds can be easily procured in the bazaar. A small piece of the pulp which is white is used, and if found in the eye might be mistaken for a piece of inspissated mucus.

The irritant as a rule is introduced into the lower fornix as this is more accessible, but occasionally it may be introduced into the upper fornix as well and very rarely into upper fornix alone. When introduced into the lower fornix a severe inflammation of the lower lid and lower part of the eyeball results. There is a marked swelling of the mucous membrane of the lower lid, often with oedema of the skin. There is intense chemosis of the fornix and lower half of the bulbar conjunctiva, with usually some ecchymosis at the centre of the lower fornix. This ecchymosis is no doubt due to the fact that the irritant has rested on that spot and consequently

the inflammation is more intense there. Where the inflammation is more severe a slough is formed at the centre of the fornix. The slough may extend on to the mucous membrane of the lower lid and the lower part of the bulbar conjunctiva. The mucous membrane of the upper lid and the upper part of the eyeball is almost normal in appearance except in those cases where the irritant has been inserted under the upper lid. One can often see long after the inflammation has subsided, the trace of a former artificial ophthalmia in the presence of a partial symblepharon at the site of a former slough.

One of the most striking features of this disease is the absence of or the slightness of the discharge. Such an intense inflammation due to bacterial causes would, at least after a few days, give rise to a profuse discharge.

When the irritant is stopped the inflammation clears up with remarkable rapidity. In a few days it is difficult to recognize the case as having been one of artificial ophthalmia.

The cornea is very rarely affected and remains bright and clear. This is in marked contrast to gonorrhoeal ophthalmia, in which with the same degree of chemosis, one would probably get some infiltration of the cornea. In one case, however, which came under notice, the cornea of each eye was involved leading to perforation in one of the eyes. In this case the sloughing in the lower fornix had been very severe, and led later to an abscess of the lower lid.

We find that cases of artificially produced ophthalmia are not usually diagnosed as such by medical officers, but are often diagnosed as gonorrhoeal ophthalmia, a comparatively rare affection, there having been only two typical cases observed in this force during the year. Given a slough in the lower fornix with chemosis of the lower part of the bulbar conjunctiva, there ought to be no mistaking such cases. We consider that the slough in that position, especially when both eyes are affected, is pathognomonic of artificial ophthalmia.

In a case that came under our notice the appearance of the conjunctival sac of one eye very strongly resembled that occurring in artificial ophthalmia, but the case was complicated by the presence of a small corneal abrasion. We found on the patient's person small pieces of what appeared to be the pulp of jequirity seeds. We inserted one of these pieces in the lower fornix of his other eye and kept it there for about twenty minutes. At the end of that time there was only a very slight redness of the lower part of the eyeball. However, thirty-six hours later a very typical artificial ophthalmia appeared with a typical slough. The condition subsided almost completely in about three days.

In another case all the clinical symptoms pointed to artificial

ophthalmia with well-marked sloughs in both lower fornices. The patient, although there was no apparent urethral discharge, gave a history of gonorrhoea eight years before. The medical officer in charge of the case had the prostate massaged and from the slight mucus discharge obtained the bacteriologist was able to find Gram negative diplococci. He obtained a similar bacillus from the eyes. In this case there had practically never been any discharge from the eyes and the inflammation disappeared without treatment in the course of three or four days. We are convinced that in spite of the bacteriological finding this was an undoubted case of artificial ophthalmia, as the objective signs were very typical. It made us both very sceptical of bacteriological results in eye cases.

In one or two of the cases that had been observed by us, there has been a coincident so-called venereal sore of the penis. We have no doubt that the venereal sores were produced in the same way as the artificial ophthalmia.

CATARACT FOLLOWING THYROIDECTOMY

BY

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CATARACT following experimental thyroidectomy in the dog has been recorded by Mr. Walter Edmunds,[1] who also cited two cases of cataract following thyroidectomy for enlargement of the gland in the human subject reported by Schiller and Westphal.

So far as I can ascertain no case of cataract following thyroidectomy in the human subject has been recorded in the English literature, and the following case is therefore of some interest.

The patient, Mrs. E. S., aged 50, of Spitalfields, was admitted into the London Hospital on October 29, 1914, with a swelling of the neck, which had first appeared seven weeks previously, and was rapidly increasing in size. A lump was at first noticed on the right side of the neck, but similar swellings had since appeared on the left side. There was pain of a shooting character in the right side of the neck, which radiated down over the right clavicle and shoulder.

Since the swelling in the neck had appeared the patient had suffered from shortness of breath, loss of voice, and cough. There was no history of haemoptysis.

On admission, there was a hard irregular tumour, the size of a hen's egg, in the position of the right lobe of the thyroid gland, and a similar smaller lump in the left lobe. The tumours moved with

the larynx when the patient swallowed, and were fairly movable on deep structures. The skin was not attached to the lumps.

There were no enlarged glands to be felt in the neck. The larynx was normal, the vocal cords moved freely, and there was no oedema of the arytenoids. The patient had slight dyspnoea, but no dysphagia. An examination of the blood gave a negative Wassermann reaction. The urine was examined and found normal.

On December 9, 1914, the right lobe of the thyroid, the isthmus and part of the left lobe containing the tumours were removed by Mr. Percy Furnivall. The thyroid was difficult to remove, although not materially adherent to surrounding structures. Three enlarged cervical glands were found and removed at the same time. A microscopical examination of the tumour by Dr. H. M. Turnbull showed it to be a solid cuboidal and giant cell medullary carcinoma of the thyroid. The cervical glands were inflamed, but not infected.

Three to four months after the operation her vision began to fail, and she came to the Ophthalmic Department of the London Hospital on March 20, 1915.

The vision in the right eye was then fingers at two feet, and in the left eye, only shadows. Projection of light was good in both eyes.

There was chronic conjunctivitis, but the cornea was bright and clear in both eyes. There was no "keratitis punctata." The pupils were equal, and reacted well to light and accommodation. The irides were greenish in colour, and appeared normal; there were no signs of irido-cyclitis.

The right lens was semi-transparent, and gave a faint red reflex. The details of the fundus were unobtainable. The opacities were of a diffuse punctate character, and showed little striation. The left lens was uniformly opaque; no red reflex was obtained.

The patient was stout, and looked myxoedematous. She was exceedingly feeble, and unable to walk without support. She complained of frequent tetanic spasms in the legs.

Thyroid gland extract in tablet form relieved the symptoms of tetany, but the patient has become more myxoedematous, and is much weaker.

It is interesting to note the time of onset of the lental opacities. In this case vision began to fail three to four months after the operation. In Schiller's[2] case the cataracts appeared about six months after the thyroidectomy by Czerny; but in Westphal's[3] case double cataract was not noted until five and a half years after the operation.

Mr. Percy Dunn[4] has recently drawn attention to the function of the thyroid gland in controlling toxaemia of septic origin, and attributes many cases of iridocyclitis, interstitial keratitis, and haemorrhages of the conjunctiva and retina to hypo-thyroidism.

There are no clinical signs of keratitis or iridocyclitis in the above case, but George Coats microscopically examined a dog's eye with cataract after thyroidectomy, for Mr. Walter Edmunds, and reported "a certain amount of infiltration of the ciliary processes, with loosening and tightening of the pigmentation of the outer layer of the epithelium." He also noted that "the aqueous contains a good deal of fibrinous coagulum, perhaps indicating an alteration in composition." In his report, Coats does not describe the condition of the retina and optic nerve, but F. Krauss[5] recently describes a case in which bilateral choked discs followed thyroidectomy.

Whether the cataract is due to a toxaemia acting on the lens through the ciliary blood-vessels or the aqueous humour, or to general nutritional changes connected with the removal of the thyroid and para-thyroid glands is uncertain, but the balance of evidence seems to point to the cause being a toxaemia uncontrolled by sufficient thyroid and parathyroid secretion.

I am indebted to Colonel W. T. Lister, C.M.G., for his permission to publish this case.

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SOME STATISTICS OF CATARACT EXTRACTION*

BY

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LEAMINGTON SPA.

THE success of an operation for the extraction of senile cataract is apt to be unfavourably influenced by three classes of complications: those which occur at the operation itself; those that supervene during the healing process; and by those which may arise at any period, even years, after a successful operation. Finally, disease of the fundus oculi may cause disappointment to both patient and surgeon. Given reasonable skill, careful attention to details, and even moderately docile patients, few cases should be lost on the table, and when such a tragedy occurs, it is almost always the fault of the patient. In my own case, losses in this manner amount to 1·5 per cent. of the total number of operations. We in

*Read at the Oxford Ophthalmological Congress, 1918.

England are very fortunate in our patients. I have operated upon many races of mankind, and have no hesitation in saying that the men and women of our race are by far the most satisfactory subjects for operations upon the eye.

The complications of healing account for the large majority of our bad results, and these are in the main, I think, due to the action of toxins either of endogenous or exogenous origin.

The problem of the safe cataract operation will be almost solved when we can eliminate iridocyclitis.

In the later stages of convalescence a late iridocyclitis or glaucoma may vitiate a successful operation, and still later, infection of the eye through a filtering scar is a complication not unknown. One of my patients lost her eye in this way after enjoying perfect vision for six years. The presence of a fundus lesion which cannot be detected before operation is not an uncommon cause of disappointment, for an ideal surgical result will not comfort the patient if sight be absent. Macular changes sometimes appear within a year of operation, and an acuity which has been good gradually fails. I have noted this more frequently in myopic eyes. Accidents after extraction are not uncommon; I have had several, but fortunately no permanent damage has resulted. The statistics I offer you comprise all my cataract extractions up to the end of 1917. They include four years' work at the British Ophthalmic Hospital, Jerusalem; and eleven years in England. The majority of the English cases were treated at the Coventry and Warwickshire Hospital, many attended the Birmingham and Midland Eye Hospital, and about fifty were operated on at the Warneford Hospital, Leamington. I have not kept a separate record to compare the work of these Institutions, but there is little to choose between the results obtained at Birmingham and Coventry. The Leamington statistics are not so good, and include four of the total losses, with both cases of panophthalmitis. This may be a mere coincidence, or it may be due to the small number of ophthalmic operations performed, and to the fact that there are no special eye wards, the ophthalmic cases being placed in the general wards. If so, it emphasizes the value of what I may term an "ophthalmic atmosphere." Patients in ophthalmic wards talk to each other, learn that they have nothing to dread, and enter the operating theatre with confidence. The statistics also embody all my private cases. The results in these have been very much superior to the others. The majority obtained an acuity of 6/12 or better, and only one case was lost from iridocyclitis. A second developed glaucoma three or four months after operation, and I believe did badly. The acuity at first was 6/9.

The first series of extractions were performed at Jerusalem, and include 64 cases.

The results obtained were as follows:

Normal extractions—52 = 80·3 per cent.

Lost eyes 4 = 6·5 „

Caused by—Panophthalmitis, 1.
Sympathetic cyclitis, 1.
Loss of vitreous, 2.

The case of panophthalmitis followed an unsuccessful attempt to extract the lens, which fell into the vitreous and could not be removed with the vectis. The other eye had previously been lost from panophthalmitis after a normal extraction by my senior colleague, Mr. W. E. Cant.

The case of sympathetic ophthalmitis left the hospital as a successful result. The last note was "slight injection." Six months later the patient re-appeared with both eyes blind, evidently from sympathetic disease. No case suffered from iridocyclitis, a complication unknown in the Hospital.

Vitreous escaped in 11 cases, a percentage of 17·2 per cent.

Many of our native and Jewish patients possessed no self-control; occasionally they squeezed out the lens in its capsule as soon as the incision was made, and the high percentage of vitreous loss must be put down to this defect.

These figures give an immediate success in 93·5 per cent. and a failure in 6·5 per cent. I am unable to give statistics of the actual acuity obtained, because most of the patients were fitted up with spherical lenses only, before leaving the hospital, say, at the end of a fortnight. A small proportion were followed up and finally provided with an accurate correction. The results, however, have some interest, for they can be compared with those claimed in India for the intracapsular operations obtained under very similar conditions. They are almost identical and afford no encouragement to surgeons to select the more difficult and hazardous procedure. The most remarkable feature of our work in Palestine was the entire absence of iridocyclitis. Few of the eyes were clean, most of them had trachoma, no cultures were taken, nor were the lacrymal sacs syringed out before operation. The conclusion is almost irresistible that iridocyclitis after operations upon the globe is not due to infection, but to a toxaemia of a nature similar to that causing iritis. In Palestine we got practically no primary iritis and no post-operative iritis. In Europe both are common.

My English cases number 200 operations upon non-diabetic patients, and 10 on diabetics. It is quite possible that there were a few diabetics among the 200, but if so the fact has not been entered in the notes.

The details of the non-diabetics are presented in the following table:

STATISTICS OF 200 NON-DIABETIC CATARACT OPERATIONS.

Vision	Numbers	Normal Operation	Needled	Vitreous Loss	Prolapsed Iris	Complications
6/4·5	22 11%	19	3	2	0	0
6/6	15 7·5%	15	1	0	1	0
6/9	37 18·5%	36	11	1	3	0
6/12	43 21·5%	42	4	0	1	3
6/18	28 14%	23	10	4	2	3
6/24	18 9%	17	5	1	0	3
6/36	12 6%	11	3	1	0	7
6/60	6 3%	5	4	1	0	4
<6/60	5 2·5%	4	2	0	1	4
Losses	14 7%	12	1	1	0	0
Total	200 100%	184; 92%	44; 22%	*11; 5·5%	8; 4%	24; 12%

The complications in the last column are : Fundus changes, corneal nebulae, and vitreous opacities.

* Five of these were vectis extractions.

Two of the successful cases in the list developed glaucoma with gradual loss of vision.

Two suffered from a late iridocyclitis, one after nine months. The operations employed were :

After preliminary iridectomy, 177 cases ; *combined extraction*, 22 cases ; *simple extraction*, one case.

Of these, four were *intracapsular extractions* which yielded a vision of 6/6 in two and 6/36 in two cases.

Six lenses were *removed with the vectis*, either because vitreous presented, or because the lens refused to present by pressure. The visions obtained were as follows, " v " indicating loss of vitreous : 6/9, v ; 6/12, v ; 6/18, v ; 6/18 v ; 6/18 ; lost, v. Four lenses were extracted under general ether anaesthesia because the patient lacked control. All did well.

Late closure of the wound occurred twice, both did well, but one developed acute glaucoma as soon as the wound closed. It was treated by general depletive measures, rest in bed, and hot applications, and rapidly disappeared.

Slight irido-encleisis, short of prolapse, was noted 10 times=5 per cent.

One of these developed a late infection after six years, and was lost.

Cystoid scar occurred three times.

Mania developed after six operations=3 per cent.

Iridocyclitis which did not destroy useful vision was present after 12 operations=6 per cent. If to this figure we add the nine examples which rendered the operation a complete failure, we get 21 cases, a percentage of 10·5.

I think that the most noteworthy fact in connection with these figures is the small number of cases needled. Only 22 per cent. of the operations called for this treatment, and only four of the 37 cases which obtained 6/6 or better, a percentage of 10·8. I believe

that most surgeons needle more frequently. I ascribe my low figure to three circumstances. One is that I generally perform a preliminary iridectomy ; another, that I rarely operate until the cataract is mature ; and the last, that if the patient is perfectly satisfied with 6/12 I do not needle to get better acuity.

I have lost two eyes after discission, and a third had a narrow escape, and so I never tempt Providence if I can avoid it. If we compare the English with the Palestine figures we get the following, in round numbers :

	England.	Palestine.
Successful extractions ...	90 per cent.	93 per cent.
Lost eyes	7.5 „	6.5 „
Iridocyclitis	10 „	none
Vitreous loss...	5.5 „	17 per cent.
Normal operations	90 „	80 „

Diabetic Cases

I wish to make no final comparison between the results obtained in the diabetic and non-diabetic cases, for the number of the former is too small for the purpose, and three of them were lost during my first year's work in England before I had introduced many of the precautions which I now adopt.

I have notes of 10 cases only, and the results were the following: 6/4.5, 1 ; 6/12, 4 ; 6/18, 1 ; lost, 4.

Iridocyclitis was responsible for all the failures. One eye became septic after the preliminary iridectomy. Two eyes in the same patient were lost from iridocyclitis which followed both iridectomy and extraction. He had previously suffered from diabetic iritis. With the exception of these three cases, I have never seen iritis after preliminary iridectomy. A fourth eye developed haemorrhagic iridocyclitis after a needling operation, and was removed.

The most profitable use we can make of such an analysis as I have compiled is to study carefully the causes which led to a total loss, or to such poor acuity that the eye was of little value to the patient. These were as follows:

Iridocyclitis	9
Panophthalmitis	2
Haemorrhage	1
Mania and recurrent haemorrhage	1
Dislocated lens...	1
	14

Of the cases of iridocyclitis : Two followed an operation upon an eye which had yielded a sterile culture. One followed a needling

operation, and it was discovered that although the lacrymal sac contained no pus, and the duct was freely patent, a dacryocystitis had been "cured" by probing many years before the extraction. One was associated with a pyorrhœa alveolaris, which had been overlooked. Another developed an acute conjunctivitis caught from a patient in the same ward, and iridocyclitis followed. The two cases of panophthalmitis occurred in the same hospital, one in which few extractions are performed. One was infected with bacillus subtilis with a few staphylococci albi and diphtheria bacilli. The second was one of the very few cases in which I have washed cortical remains out of the anterior chamber with sterile normal saline solution. The patient developed a severe attack of hay fever, and the wound suppurated on the third day.

The case of dislocated lens was in a very bad patient with no control, and the incision was a trifle small. The lens was nearly delivered but slipped back and dislocated upwards where it remained out of reach. Chronic iridocyclitis gradually developed, and after some weeks the eye was removed. Had my assistant had a lens hook ready the lens would have been delivered, and now I never omit to provide him with one.

The causes which reduced the vision under the heading 6/60 and less were as follows: Fundus disease, 7; amblyopia, 1; iridocyclitis, 1; vitreous loss, 1.

If we seek to better our cataract results we must endeavour to reduce the amount of post-operative iridocyclitis, which, if we include the diabetic cases, led to the total loss of 13 eyes, and reduced the vision in another to 6/60; 14 eyes in 210 gives a percentage of nearly 7. We can hardly expect to lessen materially the number of the other complications.

I have come to the conclusion (I admit that it is a dangerous one) that iridocyclitis is not always the effect of an infection from without, and for the following reasons:—

1. An exactly similar iridocyclitis follows blows upon the eye in aged and decrepit persons.

2. The complication is entirely absent in Palestine in spite of the fact that the eyes there are very often affected with trachoma and chronic conjunctivitis. There, too, the refinements I employ in England seemed unnecessary. In Palestine, as I have already said, iritis is one of the rarest of diseases: in other words, there is not present that tendency to uveal inflammation which we meet here.

3. If one eye has been affected with post-operative iritis the second eye is likely to suffer in the same way.

4. Increased stringency in asepsis, the use of cultures, masks, etc., does not seem to have enough influence in reducing the percentage.

5. The fact that diabetics, who are liable to iritis, are far more

likely to suffer from the disease than normal persons. It is absolutely necessary to make the asepsis as strict as possible, and I am quite certain that my most recent methods are followed by more rapid convalescence, and fewer red eyes: but now and then, for no apparent cause, an eye is lost. I now pay great attention to the condition of the teeth, and refuse to operate in the presence of pyorrhoea alveolaris. I think we must study the general state of the patient more than we have done, and with this object I now get the patient into hospital some days before the operation. This affords an opportunity of getting cultures, recording his temperature, pulse, and blood pressure, and if necessary postponing the extraction till the conditions are more favourable. The practice of preliminary iridectomy is very helpful in this respect, and often gives most valuable information.

My usual procedure is the following.—The patient is admitted four or five days before the operation. The general condition is examined, special attention being paid to the teeth and urine. If the mouth be septic, I hand the patient over to the dentist, and wait till he has improved matters. The lacrymal sacs are syringed out, and if pus be present they are excised. A culture on agar or blood serum is made. I operate in the presence of a *few* colonies of staphylococcus albus or citreus, but refuse to do so if staphylococcus aureus, streptococci, or pneumococci grow. I reject a case which gives a luxuriant growth of any organism, and have the eye treated with protargol and a 1:5,000 solution of oxcyanide of mercury. With this treatment we generally get a sterile tube. The eye is anaesthetized with a 4 per cent. solution of cocaine. I shave the eyebrows, cut the lashes short, and rub with tincture of iodine. The eye is washed out with any solution I am given, oxycyanide of mercury 1:10,000, boric lotion, or normal saline. I use a Smith's knife by preference, and make an ample incision with or without a conjunctival flap as seems most convenient. I prefer to have a flap, but make no effort to get it if it does not come naturally. I try to avoid sawing, and with the right hand generally rupture the capsule with the knife if an iridectomy has been done.

If I am doing a combined operation I am now making a practice of first trying a simple extraction, but if there is the slightest call for any extra pressure I perform iridectomy. My main objection to the simple method is that it calls for decidedly more and longer pressure than when there is a coloboma. I express any cortex which comes easily, but I do not fiddle about long with it, but prefer rather to let it absorb, than to risk vitreous loss. I bandage both eyes for two days, and then instil atropin. If I have *myself* sterilized the atropin I have no objection to instilling it just before the section and have often done so. I have tried extracting with a fully dilated pupil, but I find that it favours iris incarceration, and

have given up the practice. If the eye become injected I find that the injection of *two* doses of 10 c.c. of an activated horse serum is very useful, and use it as a routine treatment. I give the second injection within a week of the first.

Since the above paper was read at the Oxford Congress, the statistics of my cataract extractions for 1918 have become available.

They are derived from 50 operations and should afford an interesting comparison because they form a series of operations performed under a technique which should have become more perfect by experience, and because they were carried out under the best possible conditions. In practically every case a culture was obtained before operation, and nothing was attempted till it was sterile, or at most contained only the staphylococcus albus or citreus. Under these circumstances it was to be expected that the number of cases which suffered from iridocyclitis would be greatly diminished. This hope was realized, for no eye was lost from this cause. Two cases only were recorded, and I have hope that I may yet improve the vision which is now under 6/60. Five cases had less than 6/60 and must be classed as complete failures; in fact, two were removed.

The causes of failure were as follows:—

Panophthalmitis	1	Total loss.
Sympathetic ophthalmitis	1	
Iridocyclitis	2	< 6/60.
Detached retina	1	
Amblyopia	1	

This gives failure in 10 per cent. from post-operative causes, for we cannot really include a case of amblyopia as a failure, although from the patient's point of view it is almost the same thing.

The case of panophthalmitis occurred in a feeble old man. He had been kept in the ward till he was in better condition and had a sterile conjunctival sac. When the eye was removed on the third day after the operation, a culture was made. It was found that the pus from the centre of the eye contained the staphylococcus albus in pure culture. Mr. Assinder considers that the methods adopted were faulty, and that most probably there was a pneumococcus present which, however, did not grow under conditions which were unfavourable.

The case which developed sympathetic disease had a normal operation and a sterile sac. A large prolapse developed which was excised as soon as the eye was quiet. The site was covered with a conjunctival flap and apparently the eye was doing well. She went home for a month and then appeared with a mild attack of sympathetic iritis which had been present for a fortnight. The exciting eye showed fine deposits on the cornea, and the vitreous was opaque. It was excised and large doses of sodium salicylate

were administered. A full injection of galyl was administered. A blood count showed a considerable increase of large mononuclear lymphocytes. The eye quieted down, but has again relapsed and I fear will become a total loss.

The detached retina was noted a month after the operation when good vision had been attained. I extracted the other lens, and I fear that here again the retina will become detached, for there was partial detachment at the periphery when I last examined the eye. In both cases the operation was quite normal.

One case of post-operative glaucoma is found in the series. I have trephined the eye without lowering the tension, and propose to repeat the operation. The present vision is 6/60. Vitreous loss occurred three times, a percentage of 6 against 5·5 in the earlier series. In two of the cases there was no straining and the section was made with ease with a sharp knife. There appeared to be absolutely no cause for the flow of vitreous which followed the section. The lens was removed with the vectis in all three cases and the vision obtained was 6/24, 6/24, and 6/36. The actual visions obtained were not so good as in the first series, but many of the cases require needling, and the refractions will be perfected as the patients reappear. Under the circumstances no useful purpose will be served by recording them.

The routine study of cultures from the conjunctiva brought out an interesting circumstance. At one time we could not get the cases sterile and many of the patients had to be sent home as unfit for immediate operation. The wards had not been properly cleaned owing to the war. As soon as this had been done we at once began to get clean conjunctivae and the stay of the patients in the hospital at Birmingham was considerably reduced. Before the cleansing the Lay Committee had brought the long period the patients were remaining in the hospital to the notice of the Medical Committee, who pointed out the probable reason.

The net result of these 250 operations is that 87 per cent. got useful vision, and 50 per cent. 6/12 or better. Sixteen eyes were lost, the majority of them during my first two years at Coventry, before I had realized the necessity of removing septic teeth and examining the flora of the conjunctiva.

I would like to record one case which shows the danger of influenza after eye operations. During the December epidemic my house surgeon performed a preliminary iridectomy. The man left the hospital with a white eye. As soon as he got home he contracted a severe attack of influenza. The eye became very painful and inflamed. Fourteen days later he was able to return to the hospital. The eye was in a state of panophthalmitis.

ANNOTATIONS.

The Royal Army Medical Corps

Our talented and energetic colleague, Sir James W. Barrett, K.B.E., C.B., C.M.G., of Melbourne, has written a volume ("A Vision of the Possible: what the R.A.M.C. might become," London, 1919), of appreciation and of constructive criticism of the Royal Army Medical Corps. His qualifications for undertaking such a work can scarcely be questioned, for he has had experience in the Australian Army Medical Corps in Egypt as well as in the Royal Army Medical Corps itself in that country. He is now leaving the service and is strongly of opinion that if the traditions of the Corps are to be kept up some of its archaic methods must be modified and provision made for greater flexibility. A service such as Sir James imagines should lead the world in scientific medicine, and he endeavours in the present volume to indicate the lines upon which such an evolution should proceed. That the authorities are in sympathy may be inferred from the fact that they have allowed the book to be published, an attitude for which they are entitled to unstinted praise. The fundamental weakness in the administration appears to be that an officer tends to become what Sir James terms an "office wallah," that is to say, he tries to manage a body of capable men by writing letters to them often from a great distance. The most obvious change in principle is that superiors should fully and in conference discuss important items with their subordinates. Every administrative officer should be provided with an understudy of nearly the same rank as himself, so that one or the other may be constantly travelling through the command. In the higher branches of the Royal Army Medical Corps officers cease to be medical men and scientists and become administrators. It is suggested that there should be three avenues to promotion: (1) As at present, through administrative work; (2) by clinical work alone; and (3) by preventive medicine. As regards promotion, the author praises the system which has been evolved in Australia, where the matter devolves upon a board of three members, one of whom is appointed by the Secretary of State, the second by the Public Service Commissioner, and the third by the class whose members are to be promoted. Under this scheme affairs are not left, as at present, in the hands of a single individual. Sir James holds that medical officers should do medical work, and that many of the duties now discharged in the Army by them could be better done by a sergeant-major or a lieutenant-quartermaster of the Royal Army Service Corps. It is important that the newly-joined medical officer should be instructed by his seniors as to the necessity of passing on with transferred men proper clinical information respecting their condition.

Orders should be codified periodically, and issued in printed form to every medical officer in the Army. Another reform advocated is the formation of a board of reference for serious complaints made by a medical officer. Finally, Sir James calls for a Royal Commission, and suggests that a certain number of the medical commissioners should not be Government nominees, but be elected by medical officers who have served for substantial periods abroad. The recommendations of a Royal Commission may be far removed from those put forward by Sir James Barrett, but the author asks that whatever the answer "the issue should not be evaded or camouflaged." We again congratulate the authorities upon allowing so outspoken a book as this to be published. The sign is of good augury for the future of the Royal Army Medical Corps.

Panel Ophthalmic Practice

There appeared in a recent number of the *Lancet* an article dealing with the question of Panel Ophthalmic Practice. The author, Dr. Freeland Fergus, holds very strong views on the necessity for a much higher standard of qualification for those who intend to devote themselves to ophthalmology than at present obtains. In this he has our whole-hearted support as numerous recent notes in our pages can testify. When, however, he proposes that all panel patients should be examined by whole-time highly-qualified ophthalmic surgeons at some 800 to 1,000 new centres and that special hospitals should be built to accommodate them we fail to see how the cost could be met. In addition to the money difficulty it would be scarcely possible to find the necessary surgical and nursing staff. We can hardly agree with his suggestion that a competent surgeon could not examine adequately more than three children in the course of two hours. At that rate of work the whole medical profession of the country would hardly suffice for the working of his scheme.

The Teaching and Examination of Medical Students in Ophthalmology

The General Medical Council have had under consideration the report of the Council of British Ophthalmologists on the teaching of medical students. They have recommended "that every student should be required to attend a course of practical instruction in ophthalmology of not less than ten week's duration, and that no student should be admitted to the final examination unless he presents a certificate to the effect that he has attended such a course regularly and that his work in connection therewith has

reached a satisfactory standard." While we may regret that the General Medical Council have not deemed it expedient to adopt the carefully considered recommendations of the Council of British Ophthalmologists, still we welcome the distinct step in advance that they have taken. It now remains to be seen what regulations the various examining bodies will adopt to carry out the second part of the Council's recommendation. If proper means are adopted to ensure that students have attained a satisfactory standard of ophthalmic knowledge before qualification then the ideal of the Council of British Ophthalmologists will have been attained. We hold that this can best be done by having a practical and oral examination in ophthalmology as part of the final examination and that in the case of examining bodies dealing largely with internal students no other method can be satisfactory. We hope that all ophthalmic surgeons will use their influence to ensure that the General Medical Council's mild recommendation does not become a dead letter.

ABSTRACTS

I.—THE RESORPTION OF CATARACT

Verrey, Louis (Lausanne).—**A contribution to the aetiology of the spontaneous resorption of cataract.** (**Contribution à l'étiologie de la résorption spontanée de la cataracte.**) *La Clin. Ophtal.*, April, 1916.

Verrey relates at very great length the case of a man, aged 56 years, upon whom he operated for cataract. The capsule, which was very tough, contained an almost clear fluid on opening with the cystotome. The capsule was removed in the form of a sac, and was found to contain a minute nucleus, the size of a small pin-head. The patient was myopic, and presented evidences of recurrent attacks of iritis. An interesting point is that twenty-four years previously, the other eye had been operated upon by Gayet, who, from certain evidence obtained from what Gayet had told the patient, had found the conditions to be quite similar. The interest which the case awakened in the author, and the direction in which that interest lay, may be gathered from his concluding remarks:—

"The spontaneous resorption of cataract, which is always a very slow process, is usually preceded by inflammatory phenomena, iritic or otherwise. Intra-ocular infection would penetrate the capsule of the lens, and bring about a true "phakitis," whence would arise swelling of this organ, and, frequently, rise of intra-ocular pressure.

Then would come liquefaction of the lens fibres, more or less complete resorption of the nucleus itself, and, finally, in fortunate cases, rupture of the capsule, the retraction of the latter, and formation of a black pupil, with restitution of a larger or smaller percentage of vision, which would not, probably, be more than one-sixth of the normal. Will it be possible in the future to draw practical conclusions from all this? Shall we ever be able to obtain the spontaneous cure of cataract by measures which recall, up to a point, those employed by nature in reaching her ends? . . . ."

ERNEST THOMSON.

II.—TABETIC OCULAR CRISIS

Michael, J. C.—Report of a case of tabetic ocular crisis. *Jl. Amer. Med. Association*, December 23, 1916.

The author's case was a male, aged 42 years, with typical tabetic symptoms of ten years' duration: double primary optic atrophy; under observation from March to June. In February he began to have attacks of sharp stabbing pains in left eye, coming on at irregular intervals, and lasting several seconds. During these attacks there were momentary flashes of light before the affected eye, redness of conjunctiva, and lacrimation. Some attacks were characterised by numbness and stiffness of the left side of the face, lasting for several minutes to several hours, accompanied by a burning sensation in the eyeball. Lacrimation and momentary pain and flashes of light were also noticed. Patient left the hospital at the end of June and died at home early in July.

Michael refers to a communication by Spiller in the same journal, March 18, 1916, in which he reviewed three cases previously reported, and cited one of his own.

J. B. LAWFORD.

III.—KERATITIS FROM POSTERIOR INFECTION

Fuchs, Ernst (Vienna).—Corneal affections due to infection from behind. (Erkrankung der Hornhaut durch Schädigung von hinten). *Arch. f. Ophthal.*, Vol. XCII, Part 2, 1916.

Fuchs in this paper gives a long and minute account of the microscopical anatomy of eyes in which the cornea has been affected as the result of various pathological processes in the anterior part of the eye, the disease reaching the cornea from behind. The object

of the paper is to attempt a more systematic classification of this type of corneal disease. Fuchs proposes the following scheme:

I. Acute changes.

(a) Diffuse, arranged in order of severity.

1. Ring abscess.

2. Alterations following necrosis of intraocular tumours. (In endophthalmitis, scleral rupture, corneal transplantation.)

3. Diffuse infiltration (experiments with thorium).

(b) Circumscribed (posterior infiltrate, ulcus internum).

II. Chronic changes.

(a) Diffuse, arranged in order from behind forwards.

(α) Posterior surface of the cornea.

1. Injury to endothelium.

2. Homogeneous ("glashäutige") deposition.

(β) Corneal stroma.

1. Deeper staining reaction of the posterior lamellae.

2. Proliferation of the corneal corpuscles in the posterior lamellae.

3. New vessel formation.

4. Swelling.

5. Hyaline stratification.

(γ) Anterior surface of the cornea.

1. Loosening of fibres under Bowman's membrane.

2. Pannus.

3. Lamellar stratifications. Result: sclerosis of the cornea, changes of the cornea following shrinking of the eyeball.

(b) Circumscribed.

(α) Posterior surface of the cornea.

1. Changes in the endothelium.

2. Stratification of organised exudate.

3. Stratification of homogeneous (glashäutiger) masses.

(β) Corneal stroma.

1. Proliferation of corneal corpuscles.

2. Swelling of the lamellae.

3. New tissue formation from Descemet's membrane. Result: formation of folds on posterior surface of the cornea.

4. Keratitis pustuliformis profunda.

(γ) Anterior surface of the cornea.

1. Loosening of fibres under Bowman's membrane.

2. Pannus.

3. Lamellar stratification.

4. Zonular opacity.

This scheme is only to be considered as provisional. About several of the conditions referred to there already exists a considerable amount of literature, such as ulcus internum, to which both Fuchs and Meller have contributed.

Fuchs therefore desires in his present paper to describe minutely

some of the affections which have so far not been adequately dealt with in pathological text-books. He begins by formulating some general conditions, the most important being the question of the permeability of the endothelium and Descemet's membrane. The endothelium may be killed, or after infiltration with pus cells raised and removed. The latter frequently occurs in the presence of pus in the anterior chamber. Whether immediate necrosis takes place or not depends on the virulence, that is the presence of active bacteria, in the pus. Descemet's membrane is no less permeable than the endothelium for molecules of material in solution. The degree of permeability depends on the size of the molecule, and is, therefore, higher for crystalloid substances such as atropin than for colloids like toxins. The passage of actual cells in large quantities through the intact membrane occurs. Fuchs instances a case of shrunken globe in which Descemet's membrane was thrown into folds, leaving gaps between it and the corneal parenchyma. In these gaps were numerous mononuclear cells, lymphocytes, and plasma cells which must have come from the inflamed iris. At no point could any defect of the membrane be made out. The cells had remained in the spaces and showed no tendency to infiltrate the corneal lamellae.

The rest of the paper is devoted to the description of various specimens that illustrate the changes he has adopted in the scheme given above. Two excellent plates and numerous text illustrations render the descriptions easy to follow. The great majority of the conditions described are practically confined to old degenerated eyes and are, therefore, of more importance from the point of the pathological anatomist than from that of the clinician.

E. E. H.

IV.—MISCELLANEOUS.

(First Notice)

(1) **Vogt.—The human lens shagreen and the shagreen nodules. (Der menschliche Linsenchagrin und die Chagrinkugeln.)** *Klin. Monatsbl. f. Augenheilk.*, February-March, 1915, p. 194.

(1) In a previous paper **Vogt** showed that the shagreen surface of the human lens consists of a series of furrows and ridges arranged in the direction of the fibres of the anterior layers of the lens. Both surfaces of the anterior capsule are smooth, and the shagreen-like appearance depends mainly upon the lens fibres.

The best instrument for such observations is Zeiss's binocular corneal microscope. In 200 subjects the shagreen was found to

vary very much in texture, being least distinct in young children. Pathological changes in the shagreen are rare; in iritis with moderate exudate it remains unaltered. In a case of ring opacity of the lens, due to a blow on the eye, the shagreen was indefinite in the area of the ring, but became distinct on the disappearance of the opacity. The shagreen-nodules (*Chagrinkugeln*) are multiple vacuole-like formations which are seen in adults but not hitherto in children. They are round, 1/15 to 1/30 mm. in diameter, and occur in little groups of 3 to 10, arranged in a zone between the centre and the periphery of the anterior lens surface. They are more common in senile cataract than in the clear lens, and in the former may be irregularly distributed over the whole anterior surface of the lens. A noteworthy feature is the almost constant bilateral character of these changes.

The paper is illustrated by three very interesting and instructive drawings.

H. M. TRAQUAIR.

(2) **de Schweinitz, G. E. (Philadelphia).—Homonymous crescentic scotomas in association with ethmoiditis and tooth-root abscess.** *Ophthal. Record*, April, 1915.

(2) **de Schweinitz** describes a right homonymous crescentic central scotoma, with considerable restriction of the peripheral fields, in a man, 45 years of age. These symptoms were ascribed to a subacute posterior ethmoiditis, and abscess cavities at the roots of the incisor and bicuspid teeth. Ten days after extraction of the teeth involved, and with treatment of the ethmoidal lesion, the vision was almost normal, the fields were greatly improved, and scotomata were only detectable with a 1 mm. disc. The symptoms were ascribed to a lesion of the left optic tract, and possibly the crescentic scotomata represented portions of developing or subsiding annular scotomata.

J. JAMESON EVANS.

(3) **Kraupa, Ernest (Prague).—The pathology of Bell's phenomenon.** *Arch. of Ophthal.*, May, 1915.

(3) **Kraupa** deals with the pathology of Bell's phenomenon. The well-known movement of the eyeballs upward and outwards on closing the lids, was first described by Bell in connection with peripheral facial palsy in 1823, and considered as a physiological act is familiar to us all. A reversal of Bell's phenomenon, *i.e.*, a downward movement of the eye when the lids are closed, has been noticed in a certain number of pathological cases. The writer reports a case in which "a normal Bell's phenomenon changed to an inverted one, and after the diseased lids had been restored to a healthy state, reverted to its former normal condition." The other published cases of this phenomenon, in connection with disease,

are discussed, and the conclusion is arrived at that in dealing with Bell's phenomenon we have to deal with a higher reflex, whose seat is in the cerebral cortex. The importance of the phenomenon from the point of view of "localisation diagnosis" is insisted on. It is difficult to do justice to the communication in the course of a short abstract.

R. H. ELLIOT.

(4) **Langdon, Maxwell H. (Philadelphia).—Hereditary deficiency of the light-sense, in otherwise healthy eyes, with report of a case.** *Ann. of Ophthal.*, July, 1915.

(4) **Langdon** records the notes of a father and daughter, suffering from hereditary deficiency of the light-sense, in otherwise healthy eyes. He first insists that such cases are quite in a different category from those in which there is ophthalmoscopic evidence of disease; this fact was first recognised by von Graefe. Nettleship groups them into two distinct classes: (1) those occurring indifferently in either sex, transmitted by either sex, and presenting myopic or hypermetropic eyeballs, and (2) those occurring always in males, but transmitted by females, and associated with myopia alone. The present cases fall into the first category on each of the three counts above stated. The pedigrees of other similar cases are given and discussed. All the cases had uniformly good vision, and full fields in bright illumination, but a deficiency of the light-sense, which was congenital and stationary from birth onwards. Langdon discusses the seat of the trouble, and inclines to the view that the defect is cortical, and that the condition is similar to that which produces congenital amblyopia for form, and to that which produces the many variations of subnormal colour perception.

R. H. ELLIOT.

BOOK NOTICES

Revista Cubana de Oftalmologia. Vol. I, parts 1 and 2, Jan.-June, 1919. Habana (Cuba): Prado, 105. Subscription, $6, gold, per annum.

This quarterly publication, which is edited by Dr. Francisco M. Fernández, and of which Dr. Jesús M. Penichet is the secretary, is an exceedingly well produced number. The editor announces in his preface that eventually he hopes to publish monthly, but that for the present, to be on the safe side, the work will appear at three monthly intervals. The journal begins with a biographical section containing notices of that grand old man of Spanish Ophthalmology, Dr. J. Santos Fernández, of Dr. H. V. Würdemann, of Seattle,

Washington, of Dr. Victor Ribon, of Columbia, of Dr. Francisco, R. Argilagos, of Dr. Martin Cohen, of New York, and of Dr. Clarence Loeb, of Chicago. The scope of the publication is the recording of original work and a review of current ophthalmology. Among the original papers in this number are no fewer than eight by Dr. J. Santos Fernández; Uribe y Troncoso, Rincones, Gonzalez of Mexico, Penichet, Martin Cohen, and Sabater of Valencia, each contributes one paper, while Espino contributes two papers, Francisco M. Fernández six papers, and Guiral two papers. Among these J. S. Fernández and Penichet write mostly on trachoma in Cuba, M. Cohen, records a case of primary intra-dural tumour of the orbital portion of the optic nerve, and Sabater contributes a lengthened paper on excision of the lacrymal sac.

The review of current ophthalmology deals with material published in 1917-1918; the matter is well arranged under various headings, while some abstracts are also given from the better known foreign ophthalmic journals, mainly French, Spanish, and American.

Notices of the more prominent ophthalmic surgeons who died in 1918 complete the fasciculus.

Paper and printing are very good, the illustrations are few in number, but of excellent quality.

The collaborators include men in all parts of the world save Germany and Austria. We note that Egypt is represented by A. F. MacCallan, India by Colonel F. P. Maynard, and England by Colonel R. H. Elliot and R. R. James.

We extend a very cordial welcome to this new journal, long may it continue; if only the succeeding numbers are as good as the first its success is assured. R. R. JAMES.

Report of the Government Ophthalmic Hospital, Madras, for the year 1917. By Lt.-Col. HENRY KIRKPATRICK, I.M.S.

An analysis is given of 928 cataract operations performed by one surgeon. Only one intracapsular operation was done; and there were only eight simple extractions.

Herbert's method of conjunctival disinfection was followed, "practically every patient being given a full two minutes' irrigation of 1 in 3,000 perchloride of mercury." Three eyes were lost from panophthalmitis, one of the three almost certainly became infected some days after operation and in another the same explanation was possible. In the first of these there was a "good quiet eye on the sixth day," and in the other iritis, and among other failures it is mentioned that "eight had irido-cyclitis." The results therefore leave room for improvement in the matter of sepsis. It may be mentioned here that the reviewer in recent work in Northern India has found two minutes irrigation insufficient for many eyes with

considerable trachomatous scarring. The period of conjunctival irrigation has varied there from 2-3 minutes.

Another detail in the Madras procedure to which some objection may be taken is the short period of only an hour between the removal of a trial bandage (applied the previous night) and the time of operation. It is only to be expected that a bandage applied for more than the normal period of sleep must tend to encourage the growth of conjunctival organisms to a degree scarcely to be recovered from in an hour. The dressing should be removed early in the morning and the eyelids left unwashed for inspection.

Kirkpatrick adheres to the Madras practice of performing the capsulotomy before making the section, with a Bowman's needle introduced at the point selected for subsequent introduction of the point of the Graefe's knife. He has nothing but good to say of it. If the needle be held lightly the danger of aqueous escape is infinitesimal; and in any case the chamber can easily be refilled with saline by applying the nozzle of the McKeown irrigator to the puncture.

A block covered with a towel soaked in disinfectant and placed beside the patient's head, is used to support the upper half of the surgeon's forearm, thus insuring increased steadiness in making the section.

If the patient strains or rolls his eyes the speculum is removed and Smith's lid control substituted, a double hook being used instead of the single one. And should vitreous threaten or escape, the lid is at once pulled forward on the hook. The rate of vitreous loss was only 2.59 per cent., and half the accidents were due to violent squeezing at the completion of the section.

There was the very high prolapse (of iris) rate of 4.96 per cent. It was attributed partly to replacing the dressing by a shield alone after 24 hours, and partly to rather numerous peripheral (buttonhole) iridectomies. These were evidently not found so effectual as complete iridectomies.

H. HERBERT.

NOTES

Deaths

WALTER T. CLEGG, of Liverpool, has died suddenly, after convalescence from pneumonia, at the age of 60 years. To begin with he settled in general practice, and for some time held the post of assistant surgeon to the Liverpool Cancer Hospital. Later, he

paid special attention to diseases of the eye, and was appointed surgeon to St. Paul's Eye Hospital, and ophthalmic surgeon to the Waterloo Hospital and to the West Derby and the Prescot Unions. He leaves a widow and seven children. The funeral took place on May 17th.

Louis Edouard Desjardins, who for many years was professor of clinical ophthalmology in Laval Medical College, Montreal, has died at the age of 82 years.

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Appointments

THE K.C.M.G. has been conferred upon Col. W. T. Lister, who has been appointed surgeon-oculist to H.M. Household.

Col. J. Herbert Parsons has received the C.B.E., and Major J. F. Cunningham and Captains C. B. Goulden, R. F. Moore, Frank Moxon, and M. H. Whiting the O.B.E.

T. Milnes Bride has been appointed ophthalmic surgeon to the Manchester Children's Hospital.

Brownlow Riddell has been appointed surgeon to the Glasgow Eye Infirmary.

G. E. Burroughs has been appointed ophthalmic surgeon to the Liverpool Royal Infirmary.

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Failure to Notify Ophthalmia Neonatorum

ON May 16th last, a medical man was fined £50 at the Newcastle-on-Tyne police court for having unlawfully and wilfully neglected to obey a regulation of the Local Government Board requiring notification of cases of ophthalmia neonatorum. The information was laid by the medical officer of health. When received at the Eye Infirmary it was found that one of the infant's eyes had been lost and that there was little hope of saving the other.

* * *

The Fridtjof Nansen Prize

AT the meeting held on May 3, 1919, of the Norwegian Society of Science in Christiania, the Fridtjof Nansen Prize—Kr. 2000—was awarded to Hj. Schiötz and S. Holth for prominent work on glaucoma.